MEETINGS

Popular science meeting stresses medical topics

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The American Association for the Advancement of Science (AAAS) is probably the world's largest scientific association, with a world wide membership of 130 000 including scientists and technologists in every field. The AAAS's goals are as broad as its membership: to explain science to the public, to represent the interests of those doing scientific research to the government, and to promote scientific research through its publication, *Science*. At its 147th meeting, and its first in Canada since 1964, held recently in Toronto, the AAAS devoted the public portions to the theme "Science and Technology: Bridging the Frontiers". Over 50 scientific symposia in every major area of science took over the conference rooms of the Royal York Hotel and The Sheraton Centre for 5 days, while hundreds of contributed papers were presented in brief poster sessions. Most of the symposia were designed as interpretive or review sessions, oriented to the interested nonspecialist or nonscientist.

Choosing judiciously

The formula for intellectual satisfaction at such a meeting is to choose judiciously from among the sessions on "borderline" subjects about which you know a little, but not too much; participants who made the right choices were delighted with the AAAS meeting; so it is surprising that many of the sessions were thinly attended, and that the total registration was only 3200.

As a participant with a medical background, I was gratified to find that the scientists of AAAS consider medicine — which has often been called a technology, an art or even a trade — to be a major scientific discipline. Not only were there the inevitable displays of medical technology such as the artificial pancreas and new diagnostic imaging techniques, and explorations into the mysteries of immunology and cell biology, but the whole health field, from the development of a better shark repellent to environmental concerns, from tropical diseases to the impact of social organization on health, was a dominant theme of the meeting.

As one would expect, the AAAS organized some strong presentations of basic biology. One of the most fascinating was the session on circadian rhythms. A study presented by Dr. Elliot Weitzman of The Albert Einstein College of Medicine shows that when humans are confined to an inner laboratory in which they have no time clues, they tend to "free-run" on a cycle of 25 hours or more. Without realizing it, the "timeless" subject retires an hour later each "night", and timing of many physiologic events associated with sleep also changes. Normally, body temperature drops about an hour before one is ready for sleep, but in the free-running condition the body temperature drops gradually for several hours before sleep.

With each day of the experiment, the time gap between the temperature drop and the onset of voluntary sleep tends to increase. Ultimately, the body attempts an adjustment to bring the temperature and sleep-wake cycles back into line. At this point, many subjects switch into a 50-hour cycle in which, without realizing it, they may sleep for 16 hours and stay awake for 34, sometimes alternating between the shorter and longer cycles for several periods before reaching equilibrium. Other changes, such as the "bunching" of the REM (rapid eye movement) type of sleep into the early part of sleep, and alterations in the timing of growth hormone and cortisol excretion, also occur in free-running sleep.

"Oscillators" set the pace

Dr. Martin Moore-Ede, of the Harvard Medical School proposes that there are two "oscillators" setting the pace for the temperature and sleep-wake cycles independently in the brain, and recent animal research has located the sleep-wake pacemaker in the suprachiasmatic nuclei of various animals. Lesions in these nuclei destroy the rhythmic pattern of sleep, but do not change the amount of sleep the animal takes. The location of the temperature pacemaker, and the relationship of the system to hypothalamic hormonal control centres has still to be identified.

Surprisingly, this rather theoret-

ical work has already given rise to a new specialty, chronotherapy. Stanford University's Dr. Charles Czeisler reported that apparently some individuals go through life with disturbed sleep cycles, and some mental disturbances can be linked, although not etiologically, to aberrant sleep patterns. A medical student, chronically unable to go to sleep before 3 am, was found to have physiologic indications of the delayed sleep syndrome. Going to bed early did not prepare his body for sleep before the appointed hour, and 7 am rounds were slowly killing him. The solution was simple. Researchers advised him to go to sleep 2 hours later each "night" and within 9 days he was able to fall asleep comfortably in the evenings; allowing the cycle to "free-run" forward seems easier for the sleep centres than being forced backward.

In another case, a woman whose sleep cycle had strained her interpersonal relations for 50 years was able to reach a normal pattern within a week by the same method. In manic depressives, the temperature and sleep-wake cycles go in and out of phase, but investigators have already found that anti-depressant drugs slow down the "oscillators", that manics sometimes switch into 50-hour sleep-wake cycles, and that sleep deprivation can sometimes switch off the depressive phase.

Social networks affect health

Until recently, the subject of social networks and their impact on health, both mental and physical, has attracted mostly sociologists and psychologists but, in a stimulating 2-hour session on the subject at the AAAS meeting, information of considerable significance to medical practitioners was presented.

An individual's social network is formed by the people with whom he or she comes in contact repeatedly; some individuals, like family and coworkers, are "embedded" in the network, while others seek out and are sought out by the subject. The size and shape of the network can be a social fingerprint: schizophrenics have small networks of people who do not know each other, professionals boast large, diffuse networks of mainly unconnected people, while the typical blue-collar network is dense, that is, most members tend to know each other at least as well as the subject.

In times of personal, economic, or health crisis, the social network funnels "scarce resources", advice and action, to the person in need. As might be expected, the more technical a problem is, the more likely it is to be referred to a health care provider; but for a wide variety of health-related problems (life cycle transitions, family tensions, minor illnesses or some major chronic conditions such as alcoholism and arthritis) the network may be the court of first and last resort. Indeed, patients may consult their network to adjudicate between conflicting expert opinion of diagnosis or treatment. In general, subjects reported that "just listening" was little help; like a physician's patients, they expected and valued action more than words. Obviously, the free "services" provided by a network far outnumber the combined efforts of the health care system and all other paid helping services.

Social networks also have measurable impact on health. At the beginning of a prospective study in a San Francisco suburb, network size was weakly related to good health; but those with smaller networks had a significantly higher mortality rate during the 10-year study period, even after adjusting for age and initial state of health.

Clearly, to suggest that doctors should examine their patients' social networks and add this knowledge to patients' health equations is asking too much. However, if asked a physician can give this advice: cultivate a dense social network as a resource in a time of crisis, a diffuse network for information and advice on decisions, and, above all, remember the larger the network, the less likely it is that you'll be back in my office. In other words, as one speaker put it, social networks are the invisible army that fights the disease.

Donald A. Young, of the (US) Health Care Financing Administration reported a study that indicates scientific medical journals fulfill the needs of investigators, not practitioners. He cited a study of the way that results of two major collaborative studies, one of surgery for coronary heart disease, and one on unstable angina, were reported to scientists, and the public. In both cases, the overall results were presented to the public and press prior to peer review; yet some of the important information needed by physicians who treat patients with these conditions was not available for several years.

Results too preliminary

In general, authors take the position that their results are too preliminary to warrant their drawing conclusions directly affecting the practice of medicine; yet the headline that a new drug is more effective or that certain persons may respond best to a treatment draws immediate public attention, and the informed patient may feel his own doctor is falling behind.

Unfortunately, the researcher's peers may also be slow to "chew over" the new findings, and it may be several years before therapeutic and diagnostic innovations are "legitimized" by the approval of prestigious teachers, and passed on to practitioners.

The success of popularizers like David Suzuki and Carl Sagan also indicates that some scientists, and the public as well, feel they are not getting coherent information about scientific research, according to a reported sociologic study on scientist self-concepts. He sees scientists' drive toward specialization — knowing more and more about less and less — as being intensified by budget cutbacks and the increasing pressure to produce. As a result, the professional scientist develops a "trained incapacity" to understand society. Even if the scientist becomes a consumer advocate or an environmentalist, he is still dependent upon government or industry funding for most of his work, and the current emphasis on problem-oriented research may lead to a neglect of basic science.■